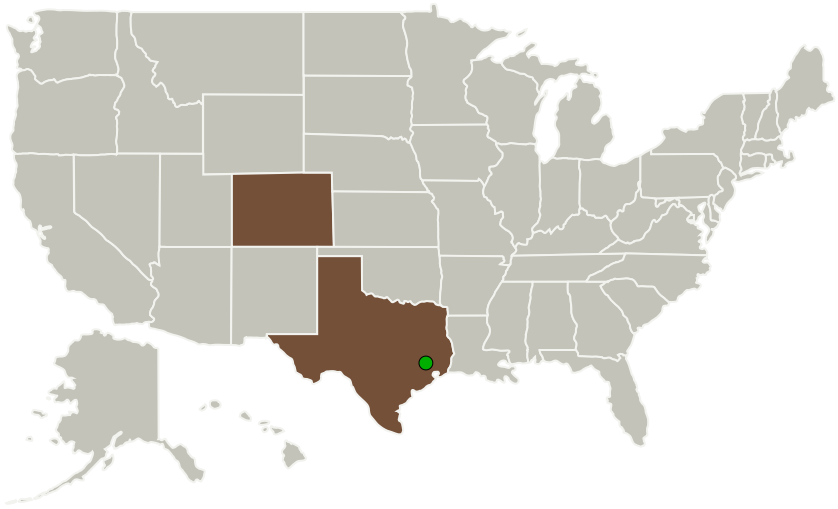
Advanced Supported Liquid Membranes for CO2 Control in EVA Applications, Phase I

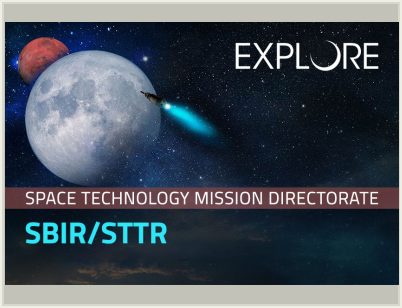
Completed Technology Project (2011 - 2011)

Project Introduction

The development of new, robust, lightweight systems for CO2 removal during EVA is a crucial need for NASA. With current and anticipated space activities, mission times will need to be extended without increasing the size and weight of the portable life support system (PLSS). While much of the recent work on the development of new CO2 control strategies has centered on solid sorbents that can be regenerated during the mission, these system add "on back" hardware, increasing weight and complexity, and reducing reliability. A simpler approach is to use a membrane system to separate CO2 from the O2 environment. Unfortunately, separating gas phase molecules with the needed selectivity is difficult with standard membranes. However, identifying a low vapor pressure liquid sorbent that will react with CO2 to form a meta stable product, could facilitate the needed separation. Therefore in this Phase I project, Reaction Systems will develop a supported liquid membrane that will have high permeance and selectivity for CO2 compared to O2, advancing the TRL from 1 to 4 by the end of the Phase I. In Phase II we will design and construct a full scale prototype, which will be delivered it to NASA.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Reaction Systems, LLC	Lead Organization	Industry	Golden, Colorado
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Colorado	Texas

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140228)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Reaction Systems, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

David Wickham

Co-Investigator:

David Wickham

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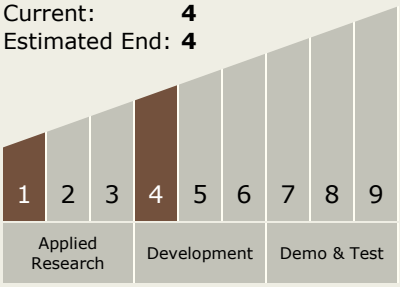
Technology Maturity (TRL)

Start: **1**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.2 Extravehicular Activity Systems
    - TX06.2.2 Portable Life Support System

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System